

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: § Group Art Unit: 3768  
David M. Mills et al. §  
Serial No.: 10/676,202 § Confirmation No.: 7118  
Filed: October 1, 2003 § Examiner: Francis J. Jaworski  
For: FOCUSING MICROMACHINED § Atty. Docket: 132147-2/SWA  
ULTRASONIC TRANSDUCER § G俞D:0566  
ARRAYS AND RELATED §  
METHODS OF MANUFACTURE §

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February 11, 2008 /Tait Swanson/  
Date Tait Swanson, Reg. No. 48,226

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Sir:

Appellants respectfully submit this Pre-Appeal Brief Request for Review concurrently with a Notice of Appeal. In the Final Office Action mailed on August 23, 2007, the Examiner rejected claims 1-4, 6-9, 11-18, 39-42 and 44-46. On October 23, 2007, the Appellants electronically filed a Response to Final Office Action to provoke an Advisory Action. As of today, PAIR does not list an Advisory Action. In view of the clear legal and factual errors set forth below and in the previous Response, the Appellants respectfully request the Panel to withdraw all outstanding rejections.

Appellants stress that no extension fees are due in association with this Pre-Appeal Brief as it is being filed *before* the mailing date of an Advisory Action. However, in accordance with 37 C.F.R. § 1.136, Appellants hereby provide a general authorization to treat this and any future reply requiring an extension of time as incorporating a request thereof. If any fees are deemed necessary in association with this Pre-Appeal Brief, then the Appellants authorize the

Commissioner to charge such fees to Deposit Account No. 07-0868; Order No. 132147-2 (GERD:0566/SWA).

### **Deficiencies of the Rejections under 35 U.S.C. § 102**

In the Final Office Action, the Examiner rejected claims 1, 2, 8, 16, 42, and 45 under 35 U.S.C. § 102(e) as anticipated by Rafter et al. (U.S. Pat. No. 6,425,869). The Appellants respectfully submit that this rejection is clearly improper and must be withdrawn in view of the following remarks and the discussion on pages 6-10 of the previous Response.

Regarding independent claim 1, the Rafter reference fails to teach or suggest “a curved lens coupled to the array of MUT cells.” The Examiner stated that “[the Rafter reference] teaches a cMUT embodiment associated with Fig. 6 and col. 13-14 top lines where the curved partially cylindrical lens 210 depicted in Fig. 2 in association with the single piezocrystal multi-element diced design may be assumed to be also used with the MUT variant which is stated to be interchangeable therewith.” Office Action, page 3. However, the Rafter reference merely states that “the response characteristics associated heretofore with a multi-element single crystal transducer may be accomplished with a MUT” and that FIG. 6 illustrates a MUT in accordance with the invention. Rafter, col. 13, lines 28-32. The Rafter reference never teaches or suggests that the MUT described in columns 13-14 may be coupled to a curved lens in the same way as the single crystal element slivers illustrated in FIG. 2 of the Rafter reference. Indeed, the MUT embodiment is an entirely separate embodiment of the Rafter reference. Suggesting that multi-element single crystal transducers may have similar response characteristics to MUTs does not necessarily suggest that similar coupling to a curved lens is possible. Furthermore, the Brief Description of the Drawings section notes that FIG. 6 “is a simplified cross-sectional view illustrating a micro-machined ultrasonic transducer (MUT) that can be integrated with the ultrasonic imaging system of FIG. 1.” (Emphasis added). It does not suggest that FIG. 6 can be integrated into FIG. 2, which shows the coupling with a curved lens. For comparison, the Brief Description of the Drawings section notes that FIG. 2 “is a perspective drawing of an ultrasonic transducer having single crystal element slivers and multiple matching layers that can be integrated with the ultrasonic imaging system of FIG. 1.” (Emphasis added). Therefore, FIGS. 2 and 6 are alternative embodiments that both represent transducers 102 as depicted in FIG. 1 of

the Rafter reference. Hence, the Rafter reference does not teach or suggest “an array of MUT cells and a curved lens coupled to the array of MUT cells” since the curved lens is a part of the embodiment illustrated in FIG. 2 and the MUT cells are a part of an alternative embodiment illustrated in FIG. 6.

Regarding independent claim 45, the Rafter reference fails to teach or suggest “a curved lens coupled in at least close proximity or directly to membranes of the plurality of micromachined ultrasonic transducer cells.” In contrast, the Rafter reference discloses single crystal element slivers 214 and an acoustic lens 210 with multiple matching layers 212 interposed between them. *See, e.g.*, Rafter, col. 10, lines 29-39; FIG. 2. As discussed above with respect to independent claim 1, FIG. 2 of the Rafter reference illustrates an entirely separate embodiment from the MUT embodiment illustrated in FIG. 6. There is absolutely no teaching or suggestion that these separate embodiments can be combined with one another. In fact, the Rafter reference fails to even mention how a curved lens could be coupled to the embodiment of FIG. 6. Furthermore, it is clear that the matching layers 212 interposed between the single crystal element slivers 214 and the acoustic lens 210 preclude the acoustic lens 210 from being “coupled in at least close proximity or directly to membranes” of the single crystal element slivers 214, much less a plurality of micromachined ultrasonic transducer cells.

### **Deficiencies of the Rejections under 35 U.S.C. § 103**

In the Final Office Action, the Examiner rejected claims 1-4, 6-9, 11-18, 39-42 and 44-46 under 35 U.S.C. § 103 based on ten different rejections. Of these, claims 1, 39, and 45 are independent. The Appellants respectfully submit that these rejections are clearly improper and must be withdrawn in view of the following remarks and the discussion on pages 11-23 of the previous Response. Appellants stress that each of the rejections listed above relies on Rafter in view of Dreschel (and often additional references) except for the rejections 8 and 9, which rely on Friemel and Barnes for claims 18, 39, 40, and 44. Again, Rafter is deficient for the reasons discussed in detail above with reference to the Section 102 rejections, and the secondary references do not obviate these deficiencies of Rafter. Moreover, Appellants previously submitted a Rule 131 declaration to swear behind both Friemel and Barnes. Thus, the rejections based on Friemel and Barnes are improper and must be withdrawn.

Regarding independent claim 1, the cited references, taken alone or in hypothetical combination, fail to teach or suggest “a curved lens coupled to the array of MUT cells.” Again, as discussed above, the Rafter reference fails to teach or suggest these claim features, and the secondary references do not obviate the deficiencies of the Rafter reference. The Examiner alternatively stated that “Dreschel et al similarly teaches that a lens may be attached to a cMUT array per col. 9-10 discussion considered together with col. 8 lines 62-65, albeit that the lens is not explicitly stated to be curved.” In fact, the Dreschel reference only mentions lenses only one time in an extremely cursory manner ‘Device 7 may also, as desired, be joined or abutted to other useful acoustic components (not shown) such as matching layers, attenuative backers, isolation windows or acoustic lenses.’ Dreschel, col. 8, lines 62-65. In addition, similar to the discussion above with respect to the Rafter reference, the Dreschel reference merely describes a “next major preferred embodiment” when discussing MUTs in columns 9-10. *Id.* at col. 9, lines 56-57. Dreschel does not teach or suggest “joining or abutting” with acoustic lenses as described with respect to the “second major embodiment” illustrated in FIG. 3. *Id.* at col. 7, lines 59-60. Moreover, based on the sparse description in the specification, the Dreschel reference does not enable one of ordinary skill in the art to couple a curved lens to an array of MUT cells. The remaining references also fail to obviate the deficiencies of the Rafter and Dreschel references.

Regarding independent claim 39, for substantially the same reasons as discussed above with reference to claim 1, the cited references fail to teach or suggest, *inter alia*, “a curved lens; a first multiplicity of MUT cells hard-wired together and disposed underneath the curved lens; a second multiplicity of MUT cells hard-wired together and disposed underneath the curved lens.” The Rafter reference fails to teach or suggest these claim features, and the secondary references do not obviate the deficiencies of the Rafter reference.

Also regarding independent claim 39, the Examiner relied upon the Barnes and Friemel references to find that one of ordinary skill in the art would have found it obvious to combine “CMOS electronics disposed underneath the first and second multiplicities of MUT cells; and a silicon substrate disposed underneath the CMOS electronics” with the other elements of independent claim 39. However, in a prior response to the Office Action mailed on February 26, 2007, Appellants swore behind the Barnes and Friemel references using a Rule 131 Declaration

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of inventor David M. Mills and associated Exhibits A and B, pursuant to 37 C.F.R. § 1.131. Therefore, the Barnes and Friemel references should have been removed from consideration by the Examiner.

Regarding independent claim 45, the cited references, taken alone or in hypothetical combination, fail to teach or suggest a curved lens “coupled in at least close proximity or directly to membranes of the MUT cells.” In contrast, the Rafter reference discloses single crystal element slivers 214 and an acoustic lens 210 with multiple matching layers 212 interposed between them. *See, e.g.*, Rafter, col. 10, lines 29-39; FIG. 2. As discussed above with respect to independent claim 1, FIG. 2 of the Rafter reference illustrates an entirely separate embodiment from the MUT embodiment illustrated in FIG. 6. Furthermore, it is clear that the matching layers 212 interposed between the single crystal element slivers 214 and the acoustic lens 210 preclude the acoustic lens 210 from being “coupled in at least close proximity or directly to membranes” of the single crystal element slivers 214. Moreover, the Dreschel reference fails to obviate the deficiencies of the Rafter reference. Instead, the Dreschel reference merely discloses a device 7 that may be joined or abutted to, among other things, acoustic lenses. There is absolutely no discussion in the Dreschel reference of the acoustic lenses being coupled to membranes of MUT cells. The remaining references also fail to obviate the deficiencies of the Rafter and Dreschel references.

For at least these reasons, among others, Appellants stress that the cited references, taken alone or in hypothetical combination, cannot support a *prima facie* case of anticipation and/or obviousness of independent claims 1, 39, and 45, and their respective dependent claims. Accordingly, Appellants respectfully request withdrawal of all outstanding rejections.

Respectfully submitted,

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